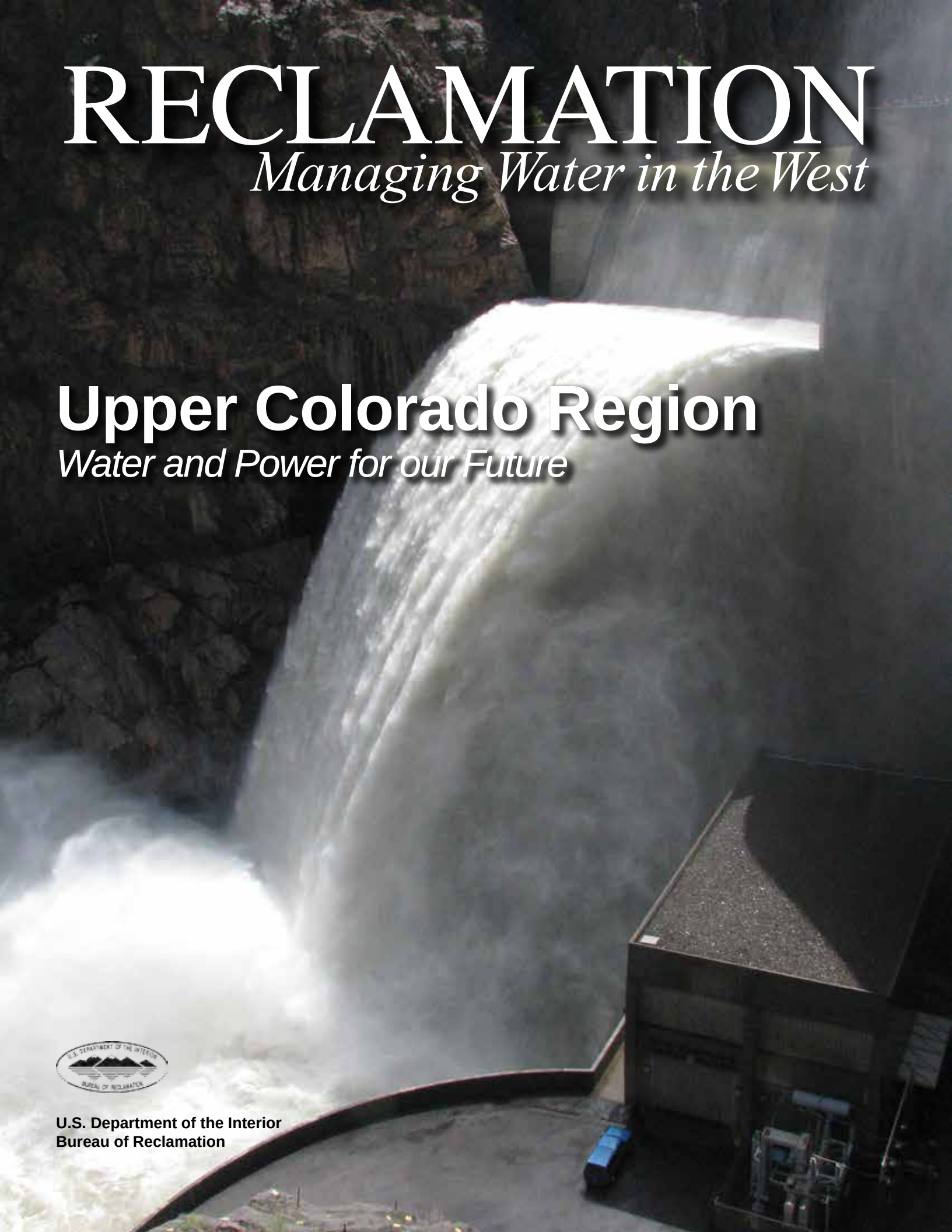
RECLAMATION

Managing Water in the West



Upper Colorado Region

Water and Power for our Future

U.S. Department of the Interior
Bureau of Reclamation

Hydroelectric power generators inside Glen Canyon Dam, Arizona
(Reclamation photo by T. Ross Reeve)

Table of Contents

Upper Colorado Region

Water and Power for our Future

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Mission of Department of the Interior

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

Mission of Bureau of Reclamation

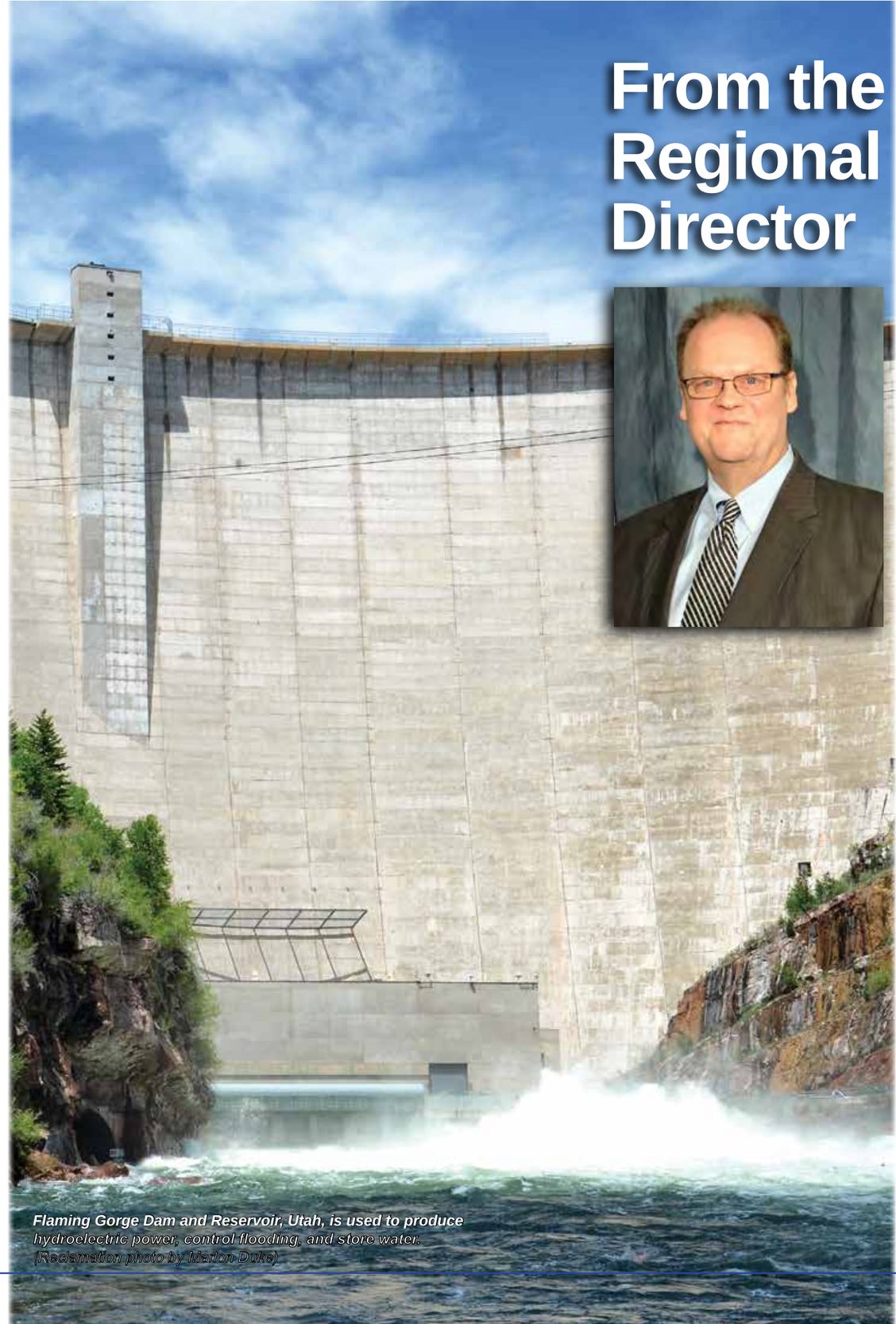
The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Mission of Upper Colorado Region

The Upper Colorado Region is a collaborative leader in water management and hydropower generation dedication to improving quality of life and preparing for the future.

Vision of Upper Colorado Region

As stewards of the public trust, we will balance the needs of our stakeholders and the environment. The Upper Colorado Region will be a model of water resource management through our expertise, forward-looking and result-oriented culture.



Flaming Gorge Dam and Reservoir, Utah, is used to produce hydroelectric power, control flooding, and store water. (Reclamation photo by Marlon Duke)

From the Regional Director

As regional director for the Upper Colorado Region, I work alongside an amazing team of professionals, the best in the federal government. Together, we deliver important water and power resources to millions of Americans, throughout and beyond the boundaries of our region. I'm proud to be a member of the Upper Colorado Region team.

We recently published a new strategic plan for our region, which builds on our employees' fantastic work throughout the region in order to push us to even greater success. Some of our current successes are seen across the region. In 2017, we filled 148 vacancies and received positive feedback about employees' work from stakeholders at the National Water Resources Association conference. Both examples illustrate our strong commitment to customer service here in the UC Region. Other examples of our dedication and professionalism include our recent completion of a water exchange negotiation with the State of Utah and the agreement with Pueblos and local leaders in New Mexico to resolve a decades-old property dispute, which will allow our continued progress on the Pojoaque Basin Regional Water System. There are many other examples I could cite. But, I also know that these examples represent just a small part of the work we do.

Our challenge now is to strive toward even greater success. That's where our new forward-looking strategic plan comes in. Developed with input from leadership all over the region, the plan focuses on continuing what we are already doing well, learning where we can improve and increasing our efficiency and effectiveness across the region. The plan is designed to help us build a culture of innovation and creativity, supported by strong leadership, professionalism, teamwork and a commitment to safety. Our strategic plan also reminds us of the importance of our role as public servants and that each of us can and should add value to our mission.

Our strategic plan defines our mission and vision and it describes our top-level goals:

1. Provide value in all stakeholder interactions.

2. Build and strengthen partnerships with Native American communities.

3. Ensure America's investments in water management and hydropower generation infrastructure continue to provide authorized benefits in an economically and environmentally sound manner.

4. Create a high-performing organization with integrated processes to increase efficiencies, manage risk, promote safety and strengthen effectiveness.

5. Develop and support a diverse, highly qualified workforce with the right skills in the right job to carry out the mission.

These goals reflect our alignment with federal legislation, Department of the Interior guidance, and Reclamation directives, standards, and policies. I believe they will promote continuous improvement in our work with Upper Basin stakeholders, our Native American communities, our infrastructure, and our organizational and workforce excellence.

Our continuous efforts to achieve, maintain, and exceed these goals makes the Upper Colorado Region a model for all of Reclamation.

Brent Rhees
Regional Director

Upper Colorado Region

At-a-Glance

768 Reclamation professionals

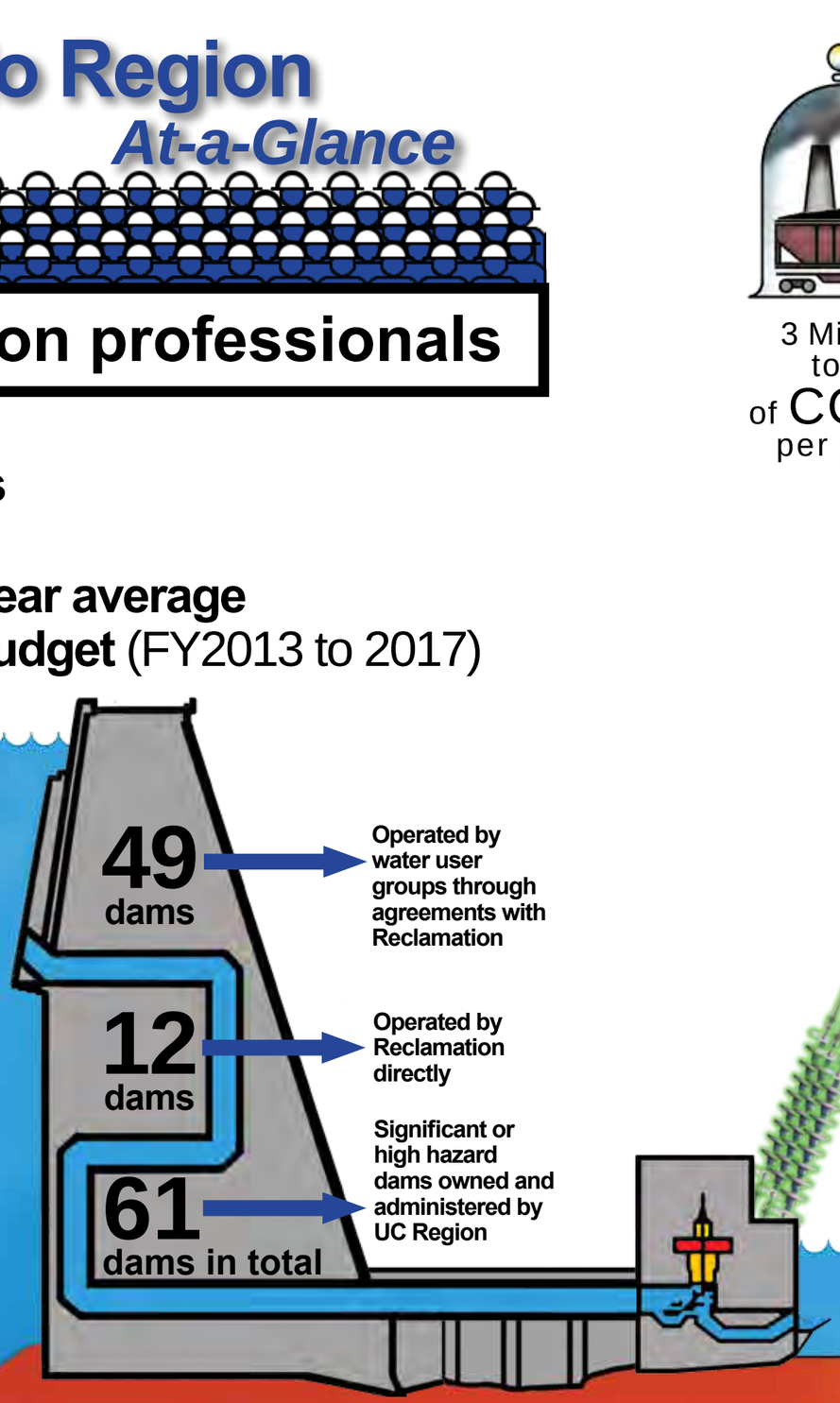
82 projects and dams

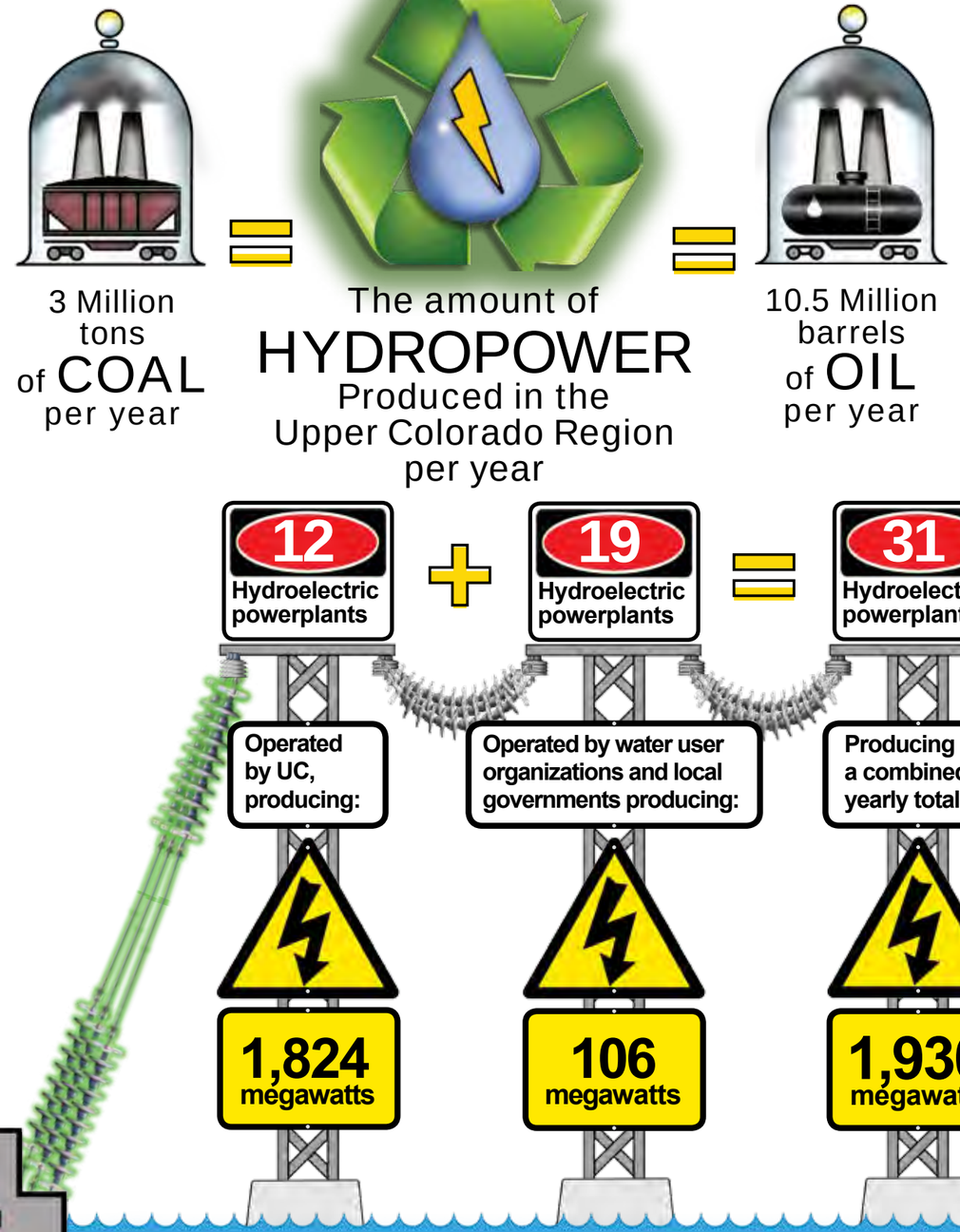
$91.7 million five-year average water-related projects budget (FY2013 to 2017)

32.4 million acre-feet * of active water storage capacity when ALL reservoirs are FULL

5.7 million people living in the Region use Reclamation water for industrial, municipal, agriculture, and environmental purposes

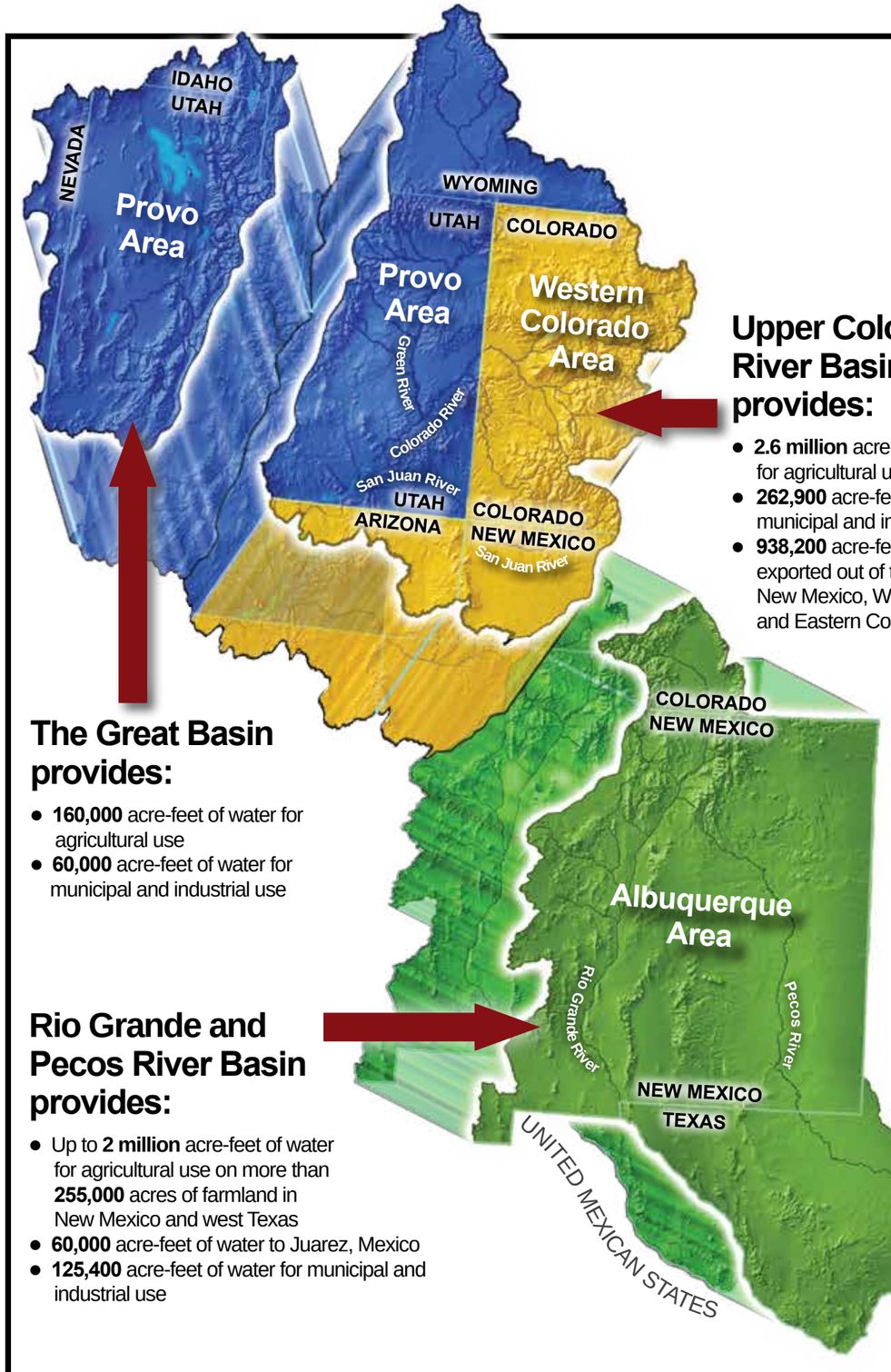
12.6 million acre-feet of water provided to irrigate 3.5 million acres of farmland





6.0 billion kilowatt-hours per year generated by the Colorado River Storage Project in support of more than 5.8 million power users in Colorado, Utah, Arizona, Wyoming, Nebraska, Nevada, and New Mexico

* 1 acre-foot = 1 acre of water, 1 foot deep = average amount of fresh water a household of six uses in one year



Upper Colorado River Basin provides:

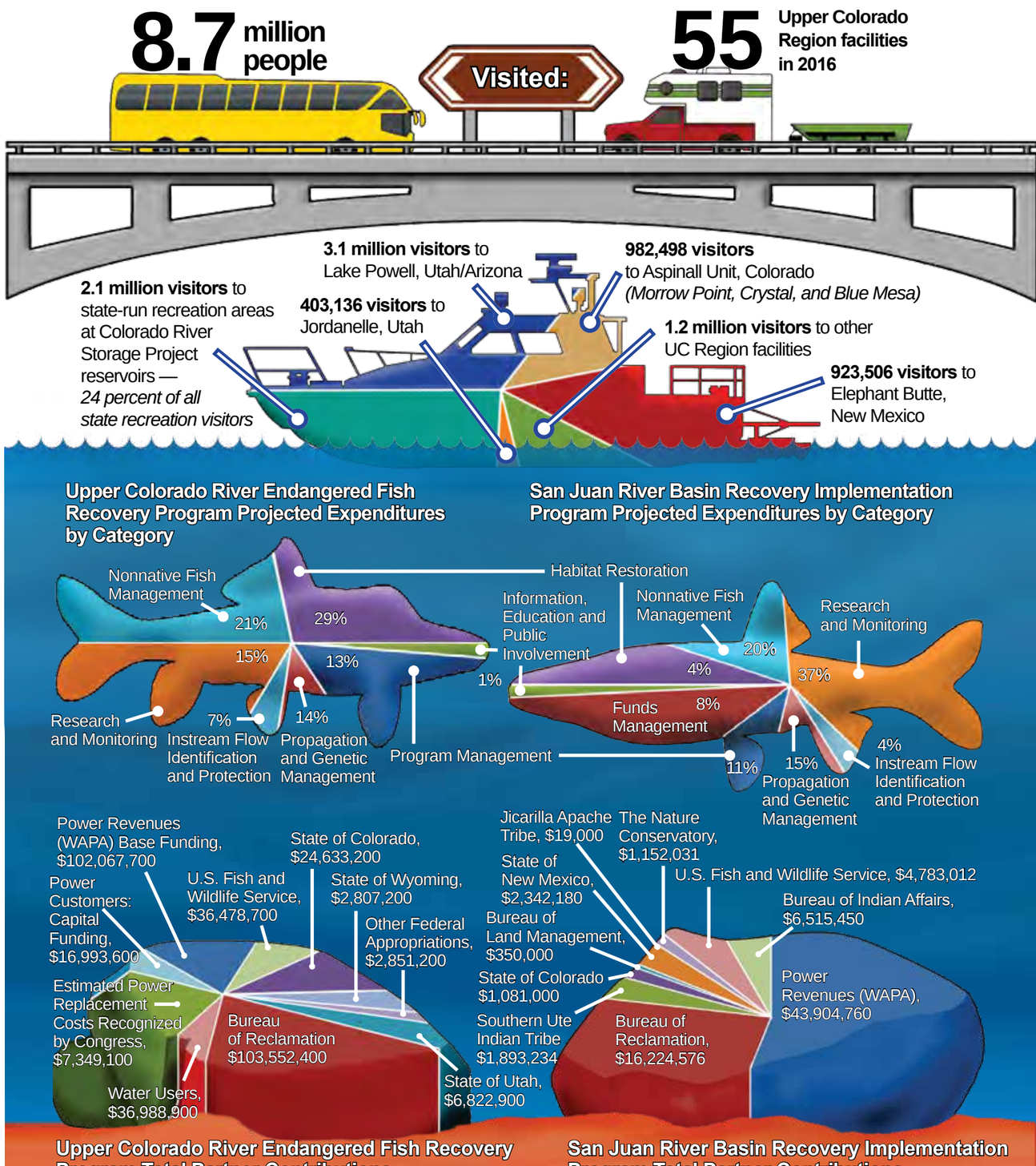
- **2.6 million** acre-feet of water for agricultural use
- **262,900** acre-feet of water for municipal and industrial use
- **938,200** acre-feet of water exported out of the basin to New Mexico, Wyoming, Utah, and Eastern Colorado

The Great Basin provides:

- **160,000** acre-feet of water for agricultural use
- **60,000** acre-feet of water for municipal and industrial use

Rio Grande and Pecos River Basin provides:

- Up to **2 million** acre-feet of water for agricultural use on more than **255,000** acres of farmland in New Mexico and west Texas
- **60,000** acre-feet of water to Juarez, Mexico
- **125,400** acre-feet of water for municipal and industrial use



Upper Colorado River Endangered Fish Recovery Program Projected Expenditures by Category

San Juan River Basin Recovery Implementation Program Projected Expenditures by Category

Upper Colorado River Endangered Fish Recovery Program Total Partner Contributions (FY1989 to 2018): **$394,325,800**

San Juan River Basin Recovery Implementation Program Total Partner Contributions (FY1992 to 2018): **$78,291,243**

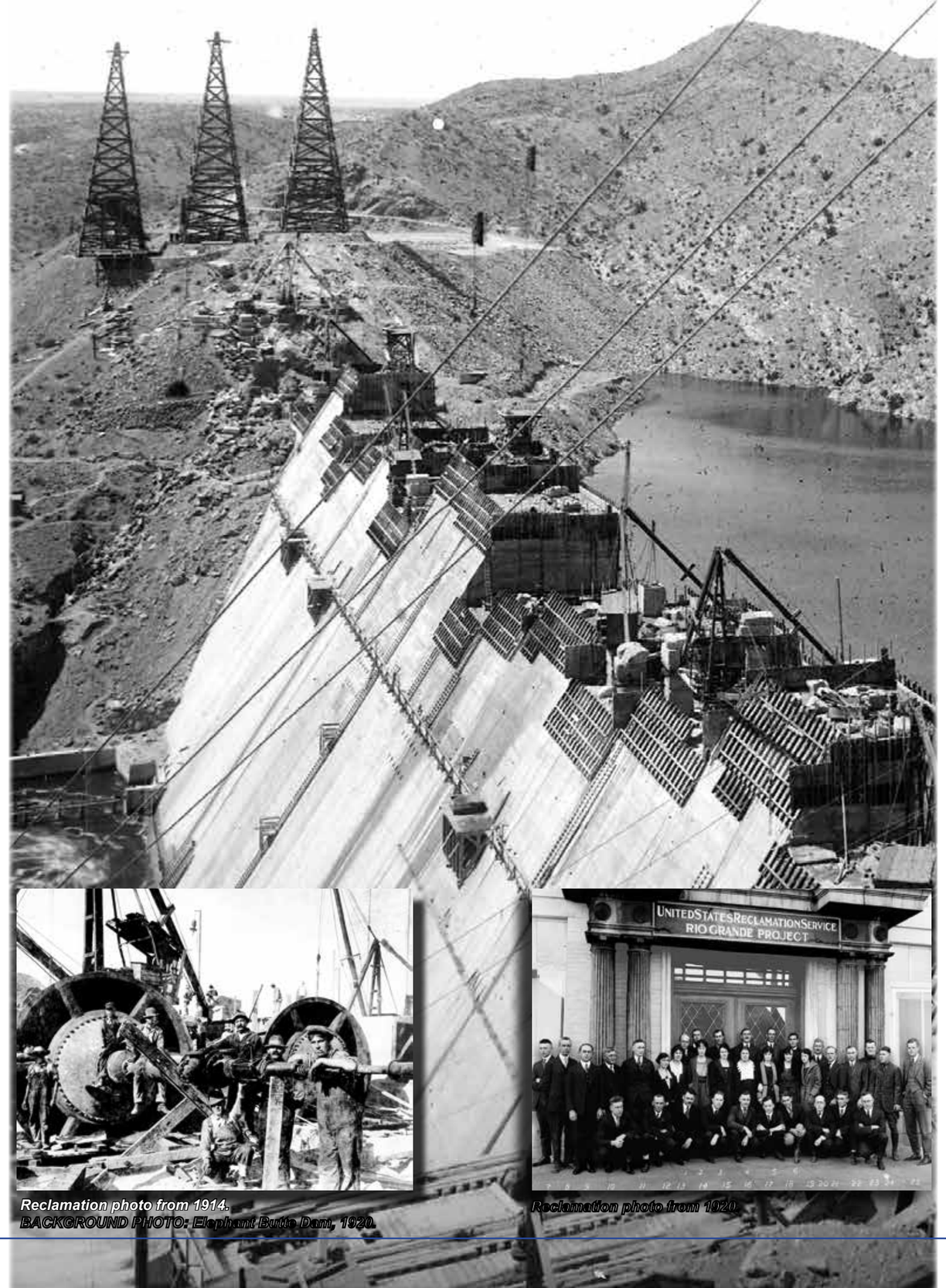
Reclamation past and present

In the mid-nineteenth century, there were few reliable water supplies in the harsh country known as the Intermountain West. An early attempt to solve this problem was made in 1891 by a group of hard-driven Westerners who originated in Salt Lake City, Utah, and called themselves the National Irrigation Congress. This group, whose early water projects led to homesteading and promoted economic development in the west, found support from President Theodore Roosevelt, and in 1902, the Reclamation Service was created as a unit within the United States Geological Survey. At the turn of the century, national leaders realized that adequate and reliable water supplies were needed before the parched west could be "reclaimed" — or in other words, brought into agricultural production. In 1907, the Reclamation Service obtained "Bureau" status, and in 1923, officially changed its name to the Bureau of Reclamation.

After constructing more than 600 dams and reservoirs during its first century, Reclamation's initial mission of providing water to the arid West has proved a great start. Today, Reclamation is the largest wholesaler of water in the country, operating 338 reservoirs with a total storage capacity of 140 million acre-feet (an acre-foot, or 325,851 gallons of water, supplies enough fresh water for a six-person household for one year).

Reclamation delivers 10 trillion gallons of water to more than 31 million people in the West each year and provides 140,000 western farmers with irrigation water for 10 million acres of farmland. These lands produce 60 percent of the Nation's vegetables and 25 percent of its fresh fruit and nut crops. As the second largest producer of hydroelectric power in the United States, Reclamation's 53 hydroelectric powerplants provide an average of 40 billion kilowatt-hours of energy each year generating nearly a billion dollars in power revenues for the federal government while producing enough electricity to serve 3.7 million homes. There are about 90 million visits to Reclamation's 289 recreation sites each year, and Reclamation activities, including recreation, contribute $48.05 billion to the Nation's economic output and support about 387,777 jobs.

Reclamation is a contemporary water management agency with a strategic plan outlining numerous programs, initiatives, and activities that will help western states, Native American Tribes, and others meet new water needs and balance the multitude of competing uses of water in the west. Our mission is to assist in meeting the increasing water demands of the west while protecting the environment and public investment in our structures. We place great emphasis on fulfilling our water delivery obligations; promoting water conservation, including water recycling and reuse; and developing and maintaining partnerships with our customers, states, and Native American Tribes. We strive to find ways to bring together a variety of interests to address the many competing needs for our limited water resources.



Reclamation photo from 1914.
BACKGROUND PHOTO: Elephant Butte Dam, 1920.

Reclamation photo from 1920.

Reclamation in the Upper Colorado Region

One of five regional offices, Reclamation's Upper Colorado Region — headquartered in Salt Lake City, Utah — encompasses Utah and New Mexico, western Colorado, northeastern Arizona, southwestern Wyoming, west Texas, and small portions of Nevada and Idaho. There are four area offices located in the region: one in Albuquerque, New Mexico (Albuquerque Area Office); one in Grand Junction, Colorado (Western Colorado Area Office); one in Provo, Utah (Provo Area Office); and the Power Office located in Salt Lake City, Utah. In addition, the Four Corners Construction Office is located in Farmington, New Mexico.

The Upper Colorado Region, named according to its general river basin area jurisdiction, is working in partnership with federal agencies, Native American Tribes, states, water users, power customers, environmental groups, and other stakeholders to seek creative and collaborative solutions to Western water issues. The Upper Colorado Region's current Regional Director, Brent Rhees, was announced in March of 2015 after serving eight years as Deputy Regional Director. The region's priorities include:

- Operating and maintaining water and power projects in a safe and reliable manner
- Protecting the health and safety of the general public and Reclamation employees
- Ensuring continued delivery of water and power benefits consistent with environmental laws and other requirements
- Implementing Indian water rights settlements
- Honoring state and Tribal water rights, interstate compacts, contracts to Reclamation users, and international treaties
- Meeting increasing demands for finite water and power resources
- Addressing complex water management issues in the West.

The Upper Colorado Region is committed to fulfilling Reclamation's mission "to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public." The challenge that lies ahead is to bring competing interests together to find consensus-based approaches to the contemporary water challenges facing the West. This includes how to best manage the quantity and maintain the quality of finite water resources in a region experiencing dramatic population growth, climate change, rapid demographic relocations, and the related impacts of these issues to aquatic ecosystems.

Working with Stakeholders

Providing value in all stakeholder interactions

Drought contingency planning

Colorado River Upper Basin drought contingency planning consists of three elements: 1) weather modification (cloud seeding) conducted by the Upper Basin States of Arizona, Colorado, New Mexico, Utah, and Wyoming; 2) demand management, a long-term effort to incentivize consumptive use reductions; and 3) drought operation contingencies, whereby water from Colorado River Storage Project facilities will be delivered to Lake Powell if certain reservoirs decline to critical elevations. At the request of, and in collaboration with, the Upper Basin States, Reclamation is exploring means and mechanisms for potential storage of water in CRSP reservoirs. Reclamation has also worked with the states to determine how water storage facilities can be operated to mitigate the effects of drought. These efforts have included modeling the combined effects of drought on the Upper and Lower Basin.

Olmsted Powerplant completed

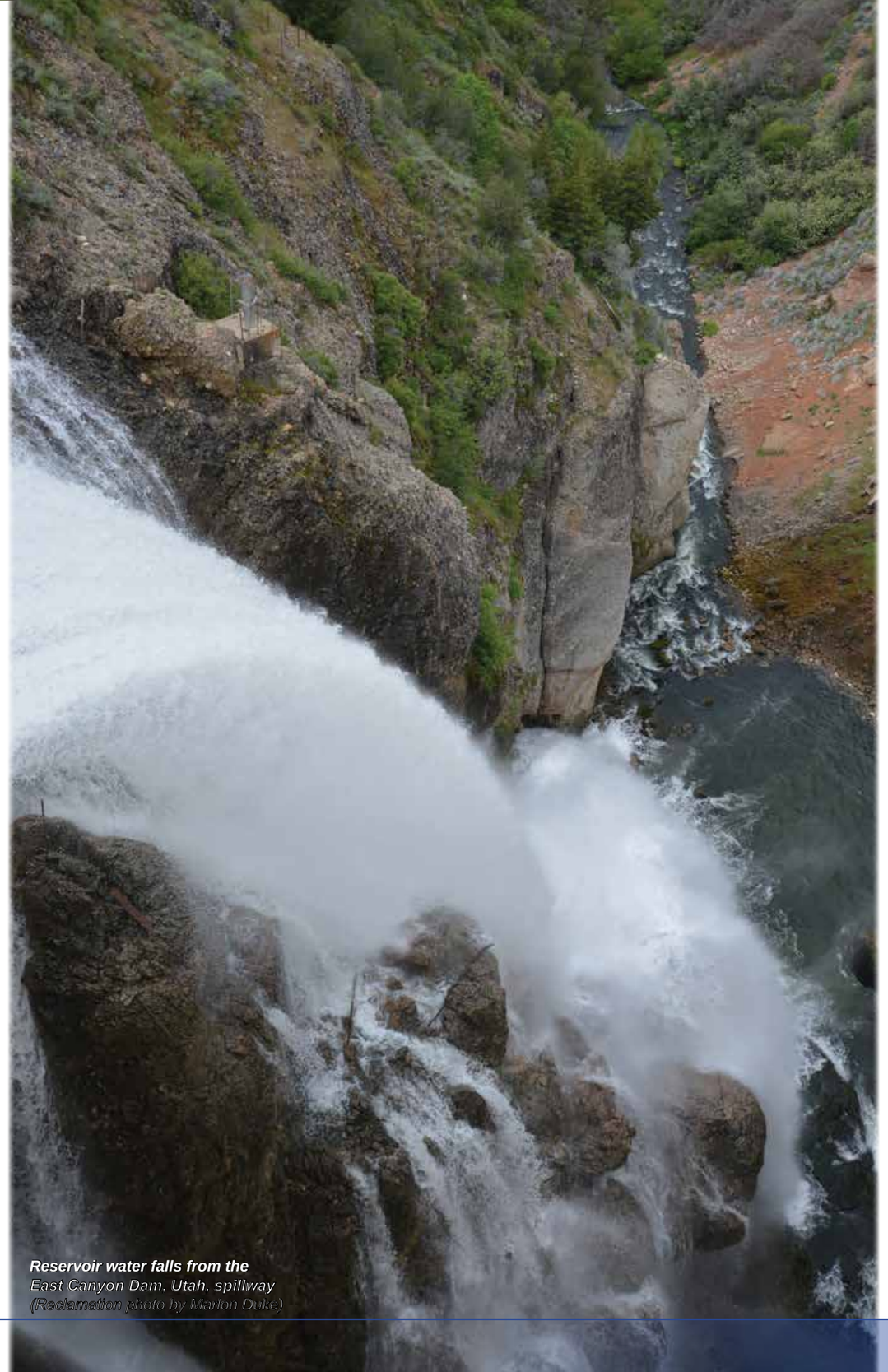
First constructed in 1896 by Lucian and Paul Nunn, the Olmsted Powerplant was once a sprawling campus that included a garage, a stable, a blacksmith shop, a foundry, laboratories, and classrooms. In addition to running a powerplant, the Nunn brothers ran a school where young engineers would work in the powerplant during the day and attend classes on the campus at night.

Originally built to power high altitude mining operations, the powerplant saw a succession of owners before being acquired by the United States in 1990. Although the United States held title to the plant, Rocky Mountain Power (formerly Utah Power and Light) agreed to continue to operate the facility until 2015.

In 2010, the Central Utah Water Conservancy District began an assessment on the condition of the powerplant and determined that several components needed to be upgraded or replaced. With input from the Reclamation Technical Service Center, Colorado, and the Provo Area Office, Utah, the district completed the design work on the project in 2016. The district recognized the historical significance of the Olmsted Powerplant and thoroughly investigated and documented the powerplant's history before construction began.

This collaboratively-funded replacement project at Olmsted was constructed by the district with management and oversight by Reclamation and the Department of the Interior's Central Utah Project Completion Act Office. The project includes a new powerhouse and penstock, removal of several structures, and modifications to the spillway and rock tunnel.

Expected benefits include protection of water rights incidental to power generation and critical to the successful operation of the Bonneville Unit of the Central Utah Project; reduction in maintenance requirements and operational costs associated with running a historic powerplant; maximizing power potential produced from Central Utah Project operations; and reduced risk of failure due to aging infrastructure. The district also plans to use the powerplant for educational purposes and members of the public will be able to tour the historic facility once construction is complete.



Reservoir water falls from the East Canyon Dam, Utah, spillway (Reclamation photo by Marlon Duke)

Weber Basin Water Conservancy District repayment negotiation

In 2015, the Weber Basin Water Conservancy District approached Reclamation with a request to prepay its $18 million obligation. Prepayment allowed the district greater latitude to make decisions about project maintenance, future financing options, and the use of project water, as well as removing some of the project use constraints contained in the Reclamation Reform Act of 1982.

After obtaining Congressional authorization through the Water Infrastructure Improvements for the Nation Act, the district paid its obligation using private market bonding. To facilitate this request, Reclamation officials from the Upper Colorado Regional Office and Provo Area Office worked with solicitors to put together a basis of negotiation — a set of legal and economic parameters under which Reclamation and the district could negotiate an agreement favorable to both parties. This agreement allowed Reclamation to accept a lump-sum payment of the district's construction repayment obligation.

System Conservation Pilot Program

The Upper Colorado Region provides financial and administrative staff support to the Upper Colorado River Commission to implement the System Conservation Pilot Program. The goal of the SCPP is to test water conservation projects through voluntary, compensated use-reduction efforts. These efforts will assist in maintaining storage volumes in Lake Powell, Utah/Arizona, and Lake Mead, Arizona/Nevada. In 2017, the SCPP was extended for a third year, during which 16 projects resulted in 12,000 acre-feet of consumptive use reductions. As a funding partner to the program, Reclamation provided oversight for the selection and evaluation of individual projects. In 2017, the Upper Colorado Region provided $300,000 in direct project support and administrative funding and over $100,000 in staff time. The region was also able to provide $1 million in funds to the Commission for 2018 projects. From 2015 through the end of 2017, 45 projects were awarded in the Upper Basin, resulting in about 21,700 acre-feet of water conserved at a cost of $4.6 million.

The new and improved

CARL HAYDEN VISITOR CENTER AT GLEN CANYON DAM

On April 4, 2017, following the recent renovation of the facilities and displays, officials and guests from Reclamation, the National Park Service, the City of Page, Coconino County, the Office of Senator Orrin Hatch, and Tribal councils of the Kaibab Band of Paiute and San Juan Southern Paiute gathered to reopen the Carl Hayden Visitor Center at Glen Canyon Dam.

The event celebrated the first full redesign and complete replacement of all the visitor center educational and informational displays since the center was first opened in 1968.

The new exhibits tell stories about Glen Canyon Dam and the Glen Canyon National Recreation Area in a contemporary and compelling way. Displays include interactive exhibits; written and illustrated explanations of hydropower production, water management, and the history of the dam; touch and feel items of historic, cultural, and scientific significance; and a Native Voices film in which members of seven different Native American Tribes share their connections to the Colorado River in their own languages. The visitor center now features an upgraded, fully-accessible theater, including open captioning, introduction loops, and assistive listening/audio description devices. The existing Reclamation and National Park Service films now include photos and trivia about Glen Canyon Dam construction and wildlife safety in Glen Canyon National Recreation Area.

The upgrades, replacements, and redesigns have already contributed to an increase in annual visitation to Glen Canyon Dam and the National Recreation Area. According to National Park Service information, the number of visitors each year to Carl Hayden Visitor Center increased from 600,000 visitors in 2015 and 2016, to 765,000 by the end of 2017 — after the renovations were complete. Visitor satisfaction with visitor centers throughout the recreation area jumped from 92 percent in 2015 to 98 percent in 2017, and satisfaction with the exhibits rose from 82 percent in 2015 to 97 percent in 2017.

New displays at Carl Hayden Visitors Center, Glen Canyon Dam, Arizona. (Reclamation photos by Alex Stephens)

Next … **Upper Colorado Region has its eyes on a major renovation of the displays at the Flaming Gorge Dam Visitor Center for the first time in more than 50 years.**

Glen Canyon Dam

Long-term Experimental and Management Plan Environmental Impact Statement

High-flow release of water from Glen Canyon Dam, Arizona
(Reclamation photo by Chris Watt)

Through the Bureau of Reclamation and the National Park Service, the Department of the Interior signed the Record of Decision for the for the Glen Canyon Dam Long-Term Experimental and Management Plan Final Environmental Impact Statement in December 2016.

The purpose of the LTEMP is to protect and improve downstream resources and ecosystems and mitigate adverse impacts to the Colorado River System below Glen Canyon Dam.

The LTEMP applies knowledge gained over the past 20 years and provides a framework for adaptively managing Glen Canyon Dam operations for the next 20 years while complying with the Grand Canyon Protection Act of 1992 and other applicable federal laws. The record of decision provides for high-flow release experiments, more equal release volumes of water, and several new tools for fish management. The plan is intended to improve sediment conditions in the in the canyon below the dam, protect cultural and recreational resources, and create a favorable environment for endangered fish in the river.

Under the LTEMP, the Department may conduct flow-based experiments (high-flow experiments, insect management flows, trout management flows, and low summer flows) at Glen Canyon Dam when resource conditions warrant.

In 2018, the Department implemented the first-ever insect management flow experiment, or “bug flows,” from May through August 2018. Bug flows consist of steady releases of water on weekends, which provide favorable conditions for aquatic-based insects to lay eggs along the banks of the Colorado River. The steady releases are designed to prevent the eggs from drying out. The projected increase in insect populations is expected to enhance the food base of aquatic and terrestrial wildlife downstream of Glen Canyon Dam.

And now ...

LAKE NIGHTHORSE

Lake Nighthorse, Colorado, part of the Animas-La Plata Project, opened for recreational activities in April 2018.

A plan to build and maintain recreation management services at the 123,541-acre-foot reservoir has been in the works since 2011 when the City of Durango first showed interest in managing recreation at the reservoir.

A boat dock, overflow parking, and breakwaters were constructed to enhance recreational use of the reservoir. All motorized boats are now inspected for invasive species and are subject to decontamination before entering the water.

To protect cultural resources in the area, recreation activities are only allowed in developed areas and limited to more than no less than 25 feet above the high-water level around the reservoir.

Twenty-five Tribes and Nations from the area, including the Animas-La Plata Project beneficiaries (Southern Ute Tribe, Ute Mountain Ute Tribe, and the Navajo Nation), were consulted on the project and provided assistance in developing a cultural sensitivity training program for employees from Reclamation, state parks, law enforcement, and contractors.

Lake Nighthorse, Colorado *(Reclamation photos by Alex Stephens)*

Controlling Salinity in Paradox Valley

The Paradox Valley Unit was constructed pursuant to the Salinity Control Act of 1974, which authorizes the construction, operation, and maintenance of projects in the Colorado River Basin that control the salinity of water delivered to users in the United States and the Republic of Mexico.

The unit is located along the Dolores River in western Montrose County, Colorado, approximately 50 miles southwest of Grand Junction. The PVU extracts naturally-occurring brine groundwater in the Paradox Valley, thereby preventing it from entering the Dolores River. Saline concentrations of this natural brine groundwater have been measured in excess of 250,000 milligrams per liter, which prior to construction of the unit, added more than 205,000 tons of salt to the Dolores River annually. Without the unit, salt load from the Dolores River would degrade the water quality of the mainstem of the Colorado River.

The PVU consists of facilities that intercept shallow brine and inject it into the Leadville Limestone, a geologic formation in Colorado, via a deep injection well. The PVU has been injecting brine since 1996. Approximately 100,000 tons of salt are injected annually; this correlates to about ten percent of the total salinity control in the Colorado River, making the PVU one of the most effective salinity control projects in the Colorado River Basin.

Because the existing brine injection well is nearing the end of its useful life, Reclamation is investigating alternatives to enhance and protect the quality of water available in the Colorado River. Reclamation is preparing an environmental impact statement to identify and evaluate these alternatives. A draft EIS outlining three action alternatives: replacement of the injection well, solar evaporation ponds, and zero-liquid discharge technology, is expected to be available in late 2019.

The latter two alternatives would require salt disposal of up to 171,000 tons per year. In addition, the evaporation pond alternative would need approximately 500 to 1,000 acres of land, while the zero-liquid discharge alternative would require up to 120 acres of land. For either alternative, 60 acres would be utilized for a landfill to dispose of the brine. Both alternatives involve obtaining public land from the Bureau of Land Management and/or private land from willing sellers. Both alternatives would also require treatment of dissolved hydrogen sulfide in the brine.

BACKGROUND PHOTO: Test run of new spillway at Echo Dam, Utah. (Reclamation photo by Chris Watt) INSET PHOTOS: Reclamation and contractor crews apply salinity control measures to existing canals. Salinity programs work to remove salts that river water picks up as it flows through the river beds. (Reclamation photos)

Reclamation helps State of Utah build new state park at Echo Reservoir

In 1968, Salt Lake City schoolteacher, Joye Ray, and four of her fellow school teachers decided to create a resort-style campground along the shores of Echo Reservoir in Utah. Of the initial founding group, only Ray continued to operate the resort until late 2017, when Reclamation offered to purchase an early termination of her concessionaire contract. Ray accepted the offer, and Reclamation is now working on plans to construct Utah's newest official state park recreation area.

Working with the Utah State Parks Division, Reclamation's Provo Area Office aims to modernize and expand the existing facilities to provide new opportunities for camping, hiking, fishing, and boating. Reclamation and Utah State Parks opened Echo Reservoir to recreational users in spring 2018 and plan to keep the reservoir open during construction. Public input has been solicited and incorporated into each phase of the design and environmental review process.

Reclamation negotiates large-scale water exchange contract with State of Utah

In 1956, Congress passed the Colorado River Storage Project Act, which authorized construction of a variety of Upper Colorado River Basin water storage projects. Because construction of these projects was such a massive undertaking, the act divided the projects into several phases. The latest, or "ultimate phase", was comprised of two units, neither of which were ever completed. In 1992, under the Central Utah Project Completion Act, Congress established that there was no present federal intent to complete the ultimate phase of the project. This left Reclamation with an unused water right, which Reclamation then assigned to the State of Utah, with the understanding that if the state benefited from any federal facilities in developing the water right, the federal government would be compensated.

The Utah State Board of Water Resources plans to use this water right for two separate projects. One project will facilitate development along the Green River (Utah). The other project involves construction of a massive pipeline designed to draw water from Lake Powell on the Utah and Arizona border to St. George, Utah, a distance of approximately 140 miles. Under the terms of the exchange, the State of Utah will forbear its entitlement under the Colorado River Compact to develop and deplete a portion of spring Green River and tributary flows. In exchange, the board will gain a right to an equal amount of Colorado River Storage Project water flowing in the Green River from Flaming Gorge Dam water releases throughout the year for flood mitigation and in support of endangered species recovery programs. The State of Utah will compensate Reclamation for the operation and maintenance of Flaming Gorge Dam, savings on pumping costs, and various other energy savings associated with the use of federal facilities.

This agreement will enable Utah to fully use its assigned water right, while assisting Reclamation in meeting its Endangered Species Act recovery program obligations below Flaming Gorge Dam. Revenue from the state will be deposited into the Upper Colorado River Basin Fund, which helps defray the costs of operating and maintaining Colorado River Storage Project units.

Working with Native American Communities

Building and strengthening partnerships

Eagle Dancer, Isleta del Sur Pueblo, New Mexico.
(Reclamation photo by Alex Stephens)

BACKGROUND PHOTO: Petroglyph's near Newcomb, New Mexico.
(Reclamation photo by Hubert (Chico) Quintana)

Student at Earth Connections Camp, Moab, Utah.
(Reclamation photo by Chad Douglas)

Navajo-Gallup Water Supply Project

The Navajo-Gallup Water Supply Project will improve the safety and quality of life by providing an increased supply of clean drinking water to many communities on the Navajo Nation as well as the Jicarilla Apache Nation and City of Gallup, New Mexico. Without the project, many of these communities would continue to personally haul water for their daily consumption.

The Navajo-Gallup Water Supply Project involves the construction of approximately 280 miles of pipeline, 13 pumping plants, and two water treatment plants and will divert a total of 27,764 acre-feet of water per year from the San Juan River. Water taken from the San Juan will supply municipal and industrial water to the eastern section of the Navajo Nation, the southwestern section of Jicarilla Apache Nation, and the City of Gallup, New Mexico.

The Navajo Nation, City of Gallup, Indian Health Service, and Western Area Power Administration have been given responsibility for the design and construction of certain features and facilities via financial assistance agreements with Reclamation.

The Navajo-Gallup Water Supply Project was authorized for construction by the Omnibus Public Land Management Act of 2009. Construction on the project began in 2012 and is expected to be completed in 2024.

Officials meet to commemorate the start of construction on the Navajo-Gallup pipeline. *(Reclamation photo)*

Placement of pipe on Navajo-Gallup Water Supply Project (Reclamation photo)

Construction on Navajo-Gallup pipeline (Reclamation photo by Marlon Duke)

BACKGROUND PHOTO: Cutter Reservoir, New Mexico INSET PHOTO: New water tank on the Navajo-Gallup pipeline project. *(Reclamation photos by Marlon Duke)*

Aamodt Settlement and Pojoaque Regional Water System

Under the Aamodt Litigation Settlement Act, which settled the longest-running Indian water rights dispute in the United States, Reclamation agreed to construct a water system capable of providing potable water to the Pueblo de San Ildefonso, the Pueblo of Pojoaque, the Pueblo of Nambé, the Pueblo of Tesuque, and Santa Fe County residents. System water is diverted from the Rio Grande before being treatment and delivery. In 2017, the Pojoaque Basin Regional Water System made substantial progress towards achieving important environmental compliance and design milestones.

The settlement is also expected to provide an economic boost to the region. Under a $91.9 million contract, engineering company CDM Smith will design and build portions of the system, which will create approximately 90 new jobs over four years. Local and Native American-owned small businesses are expected to be awarded 30 percent of the work under the contract.

A series of four public meetings were held in various locations around the project area to present alternatives and solicit comments on the draft environmental impact statement. The final environmental impact statement is now available and the Record of Decision is in the process of being finalized.

Plans for the completed system include an intake structure, a treatment plant, pump stations, storage tanks, and approximately 151 miles of pipeline. As the project progress, additional environmental compliance documentation will be required for design changes not analyzed in earlier reviews. Design levels for the project also reached 30 percent complete in 2017.

Salinity Control Project with the San Juan River Dineh Water Users

Through Reclamation's Colorado River Basin Salinity Control Program, the San Juan River Dineh Water Users will receive financial assistance for the construction of a large pipeline project. Working under a cooperative agreement, Reclamation will facilitate the water user's proposal to reduce salinity in the Colorado River above the Imperial Dam by replacing earthen ditches and canals with enclosed piping and habitat replacement.

The project will be divided into two areas. The first area is located in Shiprock Chapter, west of the Hogback monocline. The second area is located in Nenahnezad Chapter, served by the Fruitland Canal and located east of Hogback monocline. Overall, the two sub-projects cover 2,463 acres and convert 182,917 feet of open ditches into underground pipelines.

Construction, which began in February 2017, is expected to be completed by the summer of 2019.

Navajo Dam and Reservoir, New Mexico
(Reclamation photo)

Infrastructure Excellence

Ensuring America's investments in water management and hydropower generation infrastructure continues to provide and improve authorized benefits in an economically and environmentally sound manner.

Deer Creek Dam and Reservoir, Utah.
(Reclamation photo by Stacey Smith)

Notable projects completed in FY 2017 include:

- **Crystal Powerplant**, Colorado: Exciter replacement
- **Morrow Point Powerplant**, Colorado: Unit breakers, bus, and station service switchgear replacement
- **Fontenelle Powerplant**, Wyoming: Unit breaker replacements

Significant progress on major projects in FY 2017 include:

- **Glen Canyon Powerplant,** Arizona: Generator rewinds of four units
- **Elephant Butte Powerplant,** New Mexico: Penstock gate replacements

Project milestones over the next two years include:

- **Blue Mesa Powerplant**, Colorado: Station service transformers, generator rewinds, and exciter replacements
- **Morrow Point Powerplant:** Exciter replacement
- **Flaming Gorge Powerplant**, Utah: Exciter replacement
- **Glen Canyon Field Division**, Arizona: Warehouse refurbishment
- **Glen Canyon Powerplant:** Generator step-up and transformer replacements

Glen Canyon Dam, Arizona
(Reclamation photo by T. Ross Reeve)

Hydropower operations

The Upper Colorado Region operates 12 hydroelectric powerplants located throughout the western United States. These 12 hydroelectric production facilities generate a combined total of more than 6 billion kilowatt-hours of clean and reliable electricity annually. Many of the dams provide hydroelectric power to rural areas that would otherwise be forced to import power over long distances, often at financially prohibitive rates.

Glen Canyon Dam in Arizona, the largest of these powerplants produces nearly 4 billion kilowatt-hours per year — enough to meet the energy demands of 1.5 million people.

Many Reclamation hydropower facilities in the region are more than 50 years old. The Upper Colorado Region's Power Office, located in Salt Lake City, is charged with maintaining the capability of these facilities to provide clean and renewable hydropower by planning for and replacing critical equipment.

Glen Canyon Dam operations

Signed in 2016, the Record of Decision for the Glen Canyon Dam Long-Term Experimental and Management Plan Final Environmental Impact Statement provides guidance for operating Glen Canyon Dam.

The decision required revision of dam operating criteria due to the development of an annual hydrograph, changes in release criteria, and additional experimental releases.

Reclamation's Upper Colorado Region also reissued and revised the original Glen Canyon Dam Operating Criteria in compliance with the Grand Canyon Protection Act of 1992.

The Operating Criteria are meant to be a guide for Reclamation and Western Area Power Authority on the hourly, daily, and monthly releases from Glen Canyon Dam. Reclamation consulted with WAPA on the revisions of the Operating Criteria to ensure that the dam could continue to provide power.

El Vado Dam, New Mexico
(Reclamation photo by T. Ross Reeve)

Safety of Dams work at Hyrum Dam, Utah

In the course of their regularly scheduled safety inspections, Reclamation professionals discovered that, under certain conditions, the Hyrum Dam, Utah, spillway would be subject to failure. A team of Reclamation engineers immediately went to work on a cost-effective solution to strengthen the spillway. After the team identifies and proposes a plan of action to the Office of Management and Budget, the project will require Congressional approval before work on the spillway can begin. Reclamation is actively monitoring spillway conditions.

Safety of Dams work at El Vado Dam, New Mexico

Engineers studying the El Vado Dam in New Mexico, discovered that, like Hyrum Dam, El Vado may be subject to certain static risks as well as a possibility of spillway failure under certain conditions. A preferred alternative has been selected for repair of the spillway, Reclamation will perform spillway repair work in conjunction with work on the dam and abutment. Operating the dam without the use of the spillway does not pose any additional risk; Reclamation will not operate the spillway until construction is complete.

Conservation and efficiency improvements at Steinaker Dam, Utah

Steinaker Dam and the associated service canal comprise the principal features of the Vernal Unit of the Central Utah Project. In response to prolonged water shortages, the Uintah Water Conservancy District has been working to identify and implement efficiencies in several project systems. In the 7-year period from 2005 to 2011, the district found that, on average, approximately 3,800 acre-feet of water were lost every year to evaporation and seepage into the canal banks, which is equivalent to 15 percent of all water released into the canal.

The district employed a private consulting engineering firm to prepare preliminary plans and cost estimates for several different canal modification options to conserve the lost water. Reclamation facilitated a value planning study where enclosing the canal in a pressurized pipe was selected as the preferred option. The district's consulting engineering firm prepared the design and Reclamation reviewed it to ensure that design standards were met.

Because of the high estimated cost of enclosing the entire canal, the district will construct the pipeline in several phases to coincide with their ability to pay. The district received funding for a portion of Reach 1 work through a Memorandum of Agreement that allows for federal funding of certain improvements that will be used in project operation or maintenance. Reclamation used these funds to perform construction management services and purchase materials, which were installed by a contractor. Onsite work began in August 2016 and was completed in June 2017.

This project was unique in that project materials were acquired separately from the installation services, which created challenges in coordinating the delivery of materials to fit the schedule of the installation contractor. A high degree of flexibility and frequent communication between the installation contractor, the materials supplier, Reclamation, and the district was required.

Our Work with Endangered Species

INSET PHOTOS: Environmental scientists collect data on fish and plant life. (Reclamation photos)
BACKGROUND PHOTO: Reclamation scientists teach youth from Nature High Science Camp how to collect data on fish living in Lake Hill, Utah. (Reclamation photo by Chris Watt)

Reclamation continues to meet it's Endangered Species Act obligations while still fulfilling the agency's commitment to water and power delivery. In furtherance of these goals, the Upper Colorado Region manages several collaborative, multi-stakeholder Endangered Species Act programs.

The Upper Colorado River Endangered Fish Recovery Program and San Juan River Basin Recovery Implementation Program are partnerships composed of environmental groups, state and federal agencies, water and power interests, and Native American Tribes and Nations. These two recovery programs are working together to recover four endangered fish species (Colorado pikeminnow, razorback sucker, humpback chub, and bonytail) in the Colorado River system while water development proceeds in accordance with federal and state laws and interstate compacts. Recovery actions conducted by the two recovery programs include instream flow protection, habitat restoration, non-native fish control, propagation and stocking, research and monitoring, information and education, and program management. These programs have reached several important milestones since their inception. To cite just one example — in March 2018 the U.S. Fish and Wildlife Service proposed downlisting the humpback chub from endangered to threatened, a long-awaited sign of success for Colorado River stakeholders. The continued management of resources to assist humpback chub populations and their habitat is a primary reason that the species can be considered for downlisting.

The June Sucker Recovery Implementation Program is a multi-agency cooperative effort to coordinate and implement recovery actions for endangered June sucker, a native species found only in Utah Lake and its tributaries. Work to recover the June sucker and its habitat continues in a number of focus areas, including non-native and sport fish management; habitat development and maintenance; water management and protection; genetic integrity and augmentation; research, monitoring, and database management; and information and education.

Reclamation continues to provide oversight of the Glen Canyon Dam Adaptive Management Program and works closely with program partners to implement conservation measures outlined in the U.S. Fish and Wildlife Service's 2016 Biological Opinion for the Glen Canyon Dam Long-Term Experimental and Management Plan. Conversation measures under the plan will benefit the endangered humpback chub and razorback sucker and will provide monitoring for the Kanab ambersnail in Grand Canyon. Recent work on both the humpback chub and razorback sucker in Grand Canyon indicates that these two species are present at the highest numbers that have been detected in the past 10-20 years. Coordinated work in Lake Mead also suggests that razorback sucker are using both the lake and river environments and this is the only known population that is maintained through natural spawning and recruitment. The 2016 Long-Term Experimental and Management Plan Final Environmental Impact Statement and Record of Decision provide a comprehensive framework for adaptively managing Glen Canyon Dam over the next 20 years, and which will allow Reclamation to continue to deliver power and water resources and improve natural resources in Glen and Grand canyons.

Reclamation's Albuquerque Area Office continues to manage the Middle Rio Grande Endangered Species Collaborative Program, a group of 16 diverse signatories who serve as a vehicle for the promotion and application of science to support management, restoration, and recovery actions undertaken by organizations working in the Middle Rio Grande for the betterment of the river system, its listed species, and water users. Four species of concern are the Rio Grande silvery minnow, Southwestern willow flycatcher, yellow-billed cuckoo, and New Mexico meadow jumping mouse. Program activities include species monitoring, silvery minnow propagation, and studies to reduce scientific uncertainty about the listed species and river system as part of adaptive management.

Protecting infrastructure from invasive species

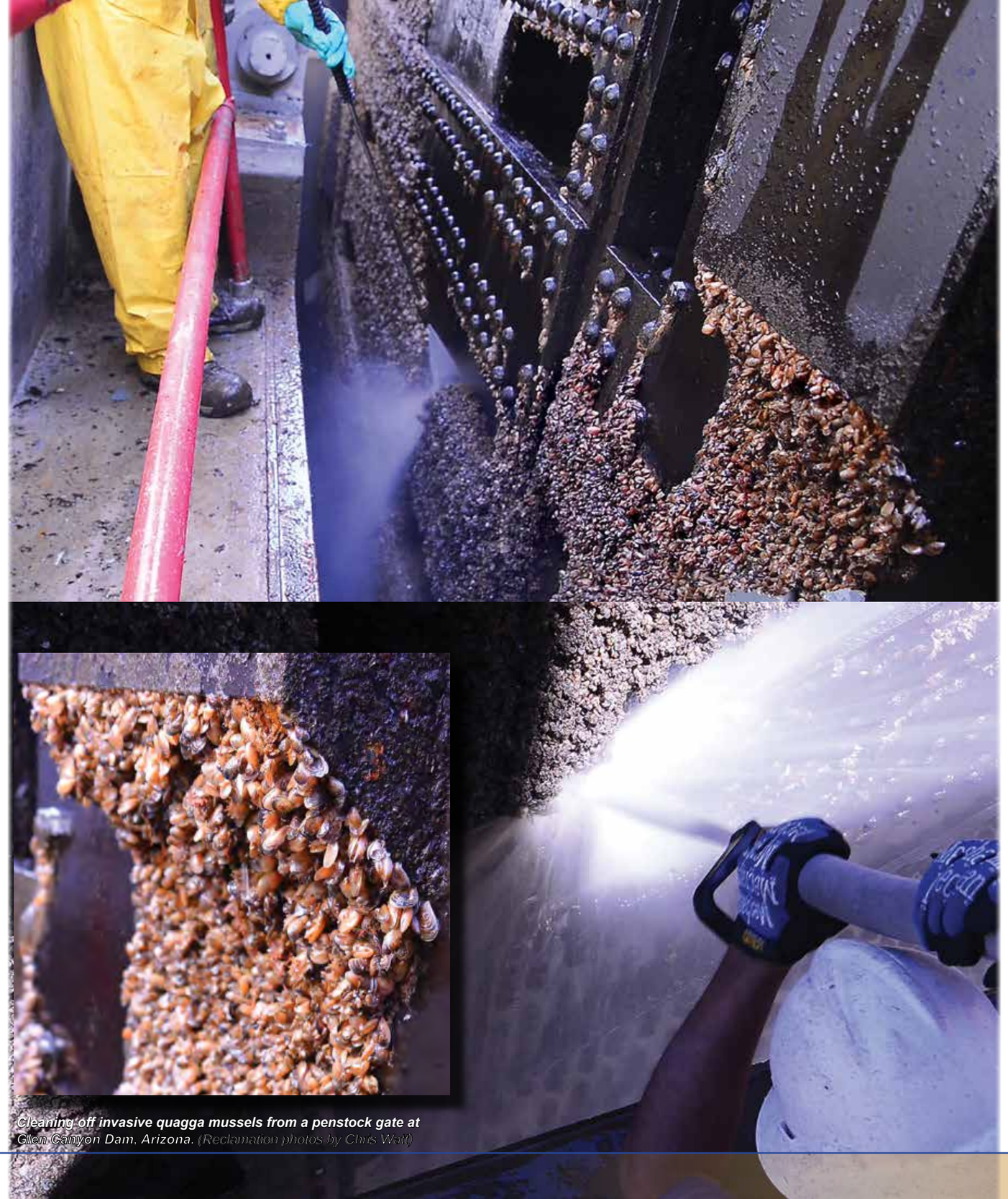
Quagga mussels, thought to originate in northern Ukraine, were first observed in American water bodies in 1989, when they appeared in the Great Lakes system. Once introduced into a water system, quagga mussels are both prolific and destructive. The invasive mussels damage native ecosystems, clog water intake facilities, and may result in large increases in operation and maintenance costs.

In January 2018, Reclamation published a report detailing the results of a Value Planning study aimed at heading off a quagga mussel infestation in the Upper Colorado Region. This report summarized a week-long effort by a working group of academics and government employees with expertise in biology, environmental compliance, psychology, law, policy, engineering, administration, economics, and public affairs. The Provo Area Office hosted the study with Reclamation employees from the Denver, Upper Colorado, and Lower Colorado regional offices.

The study was performed using Value Planning, a unique process developed by General Electric engineers as a response to World War II-era materials shortages. Value Planning uses a unique set of steps to distill processes down to their essential functions. As several participants noted, the method can be especially useful when addressing difficult, expensive, or seemingly intractable issues facing Reclamation.

Just a few of the future actions outlined in the study include:

- Developing a process to address the economic impacts of quagga mussels
- Determining which water bodies are most susceptible to infestation, and
- Developing a nationwide database to track boat movements.



Cleaning off invasive quagga mussels from a penstock gate at Glen Canyon Dam, Arizona. (Reclamation photos by Chris Watt)

Paonia Dam, Colorado: Maintenance and outlet works repairs

In addition to providing recreation and flood control benefits, Paonia Reservoir provides irrigation water to approximately 15,300 acres of land. Unfortunately, sediment from Muddy Creek flows into the reservoir and has significantly reduced existing storage capacity. At the current sedimentation rate, the reservoir will fill with sediment within the next 150 years. However, long before sediment levels reach the full pool elevation, the reservoir intake and outlet works will be affected, which will have an adverse impact on project operations.

The intake structure of the Paonia Dam outlet works has also sustained significant damage. The concrete bulkhead is cracking and there is a risk that pieces of concrete will fall into the intake structure, which could compromise dam operations and downstream delivery of water.

In 2010, an early spring drawdown of the reservoir allowed for dam operators to use high spring flows to flush suspended sediment through the outlet works. This reduced the rate at which sediment is building.

In fall 2017, Reclamation, the Fire Mountain Canal and Reservoir Company, and the North Fork Water Conservancy District cleared sediment and debris from the outlet works and removed the bulkhead from the intake structure. The bulkhead and outlet works gates will need to be replaced ahead of any modifications to the outlet works. These repairs will assist in passing the incoming sediment load. Reclamation is also working toward finding a more permanent solution to the management of sediment at the reservoir.

During 2017 operations, one of the guard gates became inoperable due to excessive wear. In addition, there is significant leakage through the two regulating gates. Reclamation is in the design process to prepare for replacement of all four gates in 2020.

Paonia Dam and Reservoir are located 16 miles northeast of Paonia, Colorado, on Muddy Creek. The dam is owned by Reclamation, and is operated and maintained by the Fire Mountain Canal and Reservoir Company under a contract with the North Fork Water Conservancy District.

Organizational Excellence

Creating a high-performing organization with integrated processes to increase efficiencies, manage risk, promote safety, and strengthen effectiveness.

Morrow Point Dam, Colorado ***(Reclamation photo)***

Upper Colorado

One Stop Shop

ACTSYSTEM

LENS
Looking Ahead Never Stops

Financial stewardship is serious business

The Acquisition Management and Financial Management Divisions began a customer service initiative focused on a variety of tasks and products aimed at standardizing processes and formats as well as normalizing customer expectations to improve the customer experience, streamline the process for specialists, and increase the timeliness and efficiency of acquisition and assistance. From this initiative, the team created four new tools for the region that have now been adopted Reclamation-wide:

UC Regional Customer OneStopShop is a web-based portal that provides a single location for all customers and staff to clearly communicate acquisitions requirements, policies and procedures, and enable customers to efficiently and effectively develop and submit quality acquisition packages.

Looking Ahead Never Stops and **Acquisition Control and Tracking System** are two new user-friendly tools to enable real-time tracking of customer requirements, including status and updates on acquisition actions, workload monitoring, acquisition planning, and loading of pending and potential acquisitions.

The Budget and Finance Reporting website uses PowerPivot to combine data from the FMD's Financial Business Management System, LENS, and ACTS to provide user-friendly executive dashboards and detailed reports.

With these tools, Upper Colorado Region has achieved and maintains obligation rates in excess of 95 percent while assuring regional priorities are considered.

Geographic Information System work at Provo Area Office, Utah

Innovators of Reclamation's Geographic Information System Program imagine a future where, using a computer or mobile device, water managers can see every document, record, image, and data-set diagrammed onto an interactive map of Reclamation's lands and facilities.

In addition to acting as a visually-indexed record-viewing system, the GIS application can be used to model a wide variety of data sets — everything from flood maps to real-time readings drawn from remote-sensing instruments. The GIS would make everyday tasks more efficient because Reclamation employees would have near-instant access to lands and facility information that was previously only available from several different departments. Because the application can process such a wide variety of data, the diverse expertise of an interdisciplinary team of Reclamation geologists, biologists, lands managers, and engineers was instrumental in the development of the program.

What comes next for the GIS Program? Members of the GIS team are currently working to increase coverage of the system by feeding more facility and lands data into the GIS system. Program managers would also like to see the application become even more versatile. Mobile capacity, which would allow employees operating in the field to retrieve and input data directly into the GIS system, is a priority. GIS managers are also considering utilizing unmanned aircraft vehicles, commonly referred to as drones, to assist with surveying and data collection.

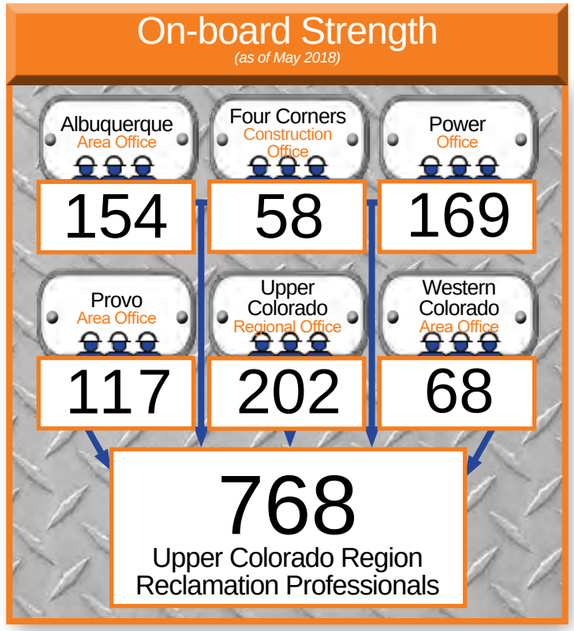
Workforce Excellence

Developing and supporting a diverse, highly-qualified workforce with the right skills, in the right job, to carry out the mission.

High scalers, suspended hundreds of feet above the Colorado River at Glen Canyon Dam, Arizona, secure layers of Navajo sandstone by drilling and anchoring metal bolts up to 16-feet long (Reclamation photo by Mark Neeley)

Regional Employees

The Bureau of Reclamation's success depends upon the dedication and contributions of its employees. The Upper Colorado Region's 768 employees strive to provide the American public with the finest water resource systems in the west in the most environmentally conscious and cost-efficient manner possible.



Leadership programs and training

The Upper Colorado Region is committed to expanding and improving developmental efforts by providing competency-based opportunities to 100 percent of our workforce. This not only increases the competency of our employees and leaders, but also helps improve safety and quality while reducing cost to the tax payer. Collaboration between internal and external strategic partners, stakeholders, and customers is also improved by these efforts.

Training focuses on competency development in the areas of accountability, interpersonal skills, oral and written communication, and continual learning. To provide opportunities to develop new leaders, the region offers two complimentary programs: the Aspiring Leaders Program and Exploring Supervision and Reclamation.

The region strives to obtain 100 percent completion for all required training. Proactively providing this important development opportunity to our workforce further enhances our culture of inclusivity by encouraging professional open communication and 360-degree accountability.

Working on a penstock gate at Glen Canyon Dam, Arizona (Reclamation photo by Chris Watt)
BACKGROUND PHOTO: Reclamation officials inspect Lemon Dam, Colorado. (Reclamation photo)

Reclamation officials inspect Blue Mesa Dam, Colorado. (Reclamation photo)

Working in a new pumping plant vault on the Navajo-Gallup Water Supply Project (Reclamation photo)

Upper Colorado Region Reorganization and Project Management Implementation

Turbine runner for a hydroelectric generator (Reclamation photo by T. Ross Reeve)

Power Office

An educated and well-trained workforce is essential to the successful operation and maintenance of the Upper Colorado Region's power facilities. The Power Office completed a major revision to its apprenticeship program for the positions of Power System Electrician and Electronics Technician, Plant Mechanic, and Powerplant Operator. The revised program will be implemented in 2018 and new apprentices recruited to help build and sustain the workforce within the power facilities.

Employee Safety

The Upper Colorado Region is committed to creating a strong and consistent safety culture by providing training and improving working relationships. When we are engaged in learning and working to improve ourselves and our relationships with each other — safety, will improve. This engagement is to build the competence of employees and enable them to carry out their duties in the safest manner possible, therefore improving safety performance.

In 2018, the region's safety group put together a Safety Reset process. This process is meant to improve the ownership of employee safety programs and reduce safety clutter — the accumulation of safety procedures, documents, roles, and activities that are performed in the name of safety, but that do not contribute to the safety of operational work.

The Flaming Gorge Field Division has been selected as the pilot for the Safety Reset Initiative. Through this process, the division will transfer from a compliance-based safety culture to one which will enable employees to be more involved in controlling their own safety programs. The beginning stages of this initiative will include group sessions to identify and reduce safety clutter and develop a culture that encourages worker involvement in decision making and safety program ownership. The ultimate goal is to create a safer working environment for the public and for Reclamation employees.

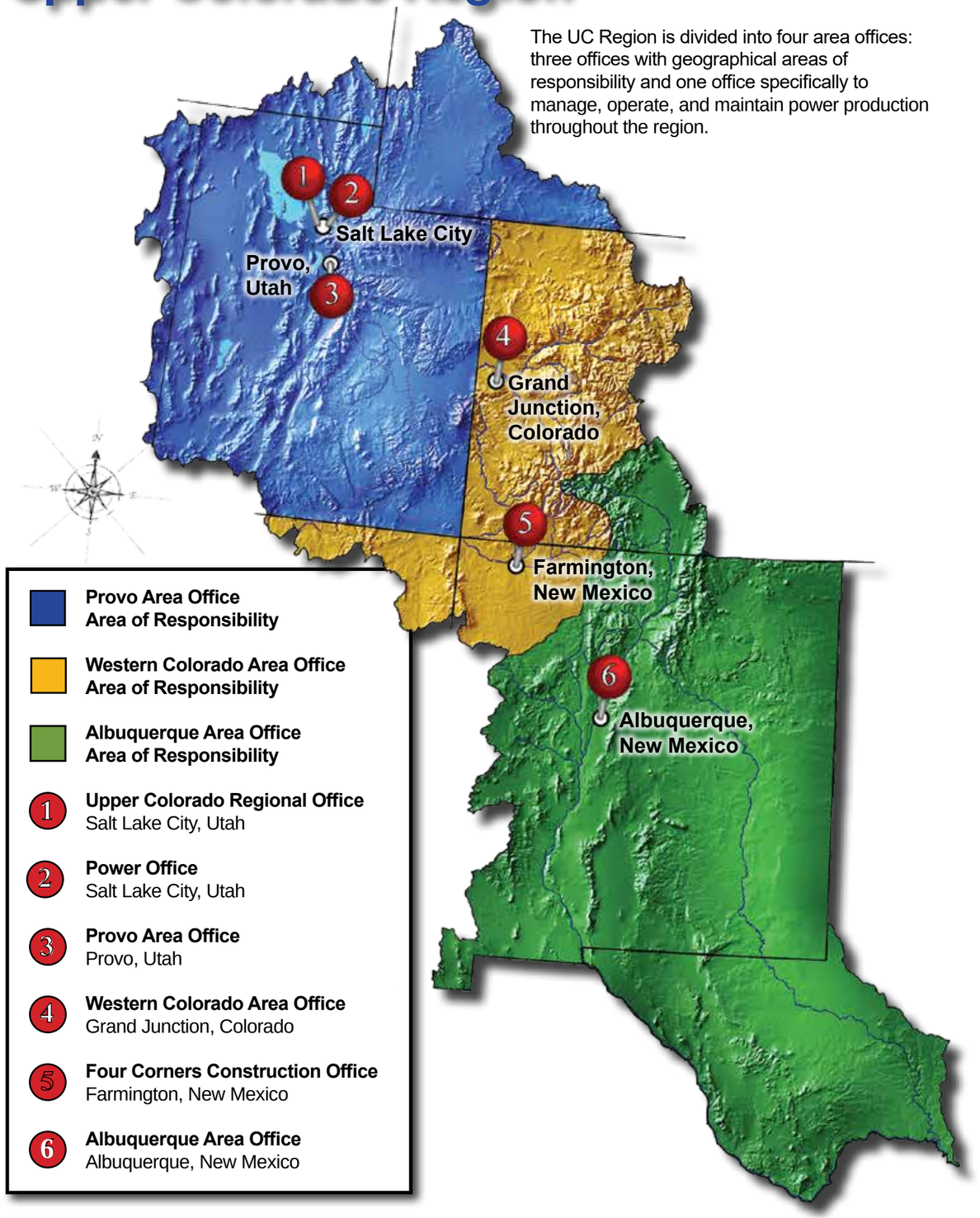
Albuquerque Area Office

Reclamation's Albuquerque Area Office doesn't shy away from change — instead, it embraces it! This way of thinking has helped reshape the organizational structure of the office to fully implement a project management approach. Under this approach, which dates to 2012, the Albuquerque Area Office has built a more project-focused office by adding multiple project managers. This allowed the area manager to better prioritize and fund projects, and to understand where the work was and how this work could be accomplished throughout the year.

By adopting a project management approach, the Albuquerque Area Office has streamlined the process of identifying projects, assigning them to a project manager, and having that person assume responsibility and control of the projects. Corresponding improvements in budget, schedule, and planning operations have followed. These improvements have, in turn, helped the office efficiently deliver a wide range of services, including those provided by staff in the environmental, lands, dam safety, and technical services divisions. Work on implementation of the endangered species recovery programs contained in the Middle Rio Grande Biological Opinion — a top priority in the office — has benefited greatly from the project management approach.

Upper Colorado Region

The UC Region is divided into four area offices: three offices with geographical areas of responsibility and one office specifically to manage, operate, and maintain power production throughout the region.



Upper Colorado Region Leadership

Regional Director
Brent Rhees

Executive Assistant
Stacie Wylie

Equal Employment Office
Tim Coplin

Deputy Regional Director
Daniel C. Picard

Deputy Regional Director
Brent C. Esplin

Regional Liaison
Tyler Larsen

Secretary
(Interim Secretary)

Special Assistant to the Regional Director
Deborah Lawler

Power Office Manager
Talmadge Oxford

Albuquerque Area Office Manager
Jennifer Faler

Provo Area Office Manager
Wayne Pullan

Western Colorado Area Office Manager
Ed Warner

Public Affairs Office Public Affairs Officer
Marlon Duke

Four Corners Construction Office Manager
Barry Longwell

Human Resources Division Manager
Sue Frigm

Technical Service Division Manager
Wayne Xia

Resources Management Division Manager
(Interim Manager)

Financial Management Division Manager
Mary Halverson

Environmental Resources Division Manager
Kathy Callister

Acquisition Management Division Manager
James Durrant

Information Resources Division Manager
(Interim Manager)

Safety, Security/Dam Safety Division Manager
(Interim Manager)

Program Management Division Manager
Shelly Wiser

Spillway at Stateline Dam, Utah (Reclamation photo)

THIS PAGE: *Water is released from the four spillways on Morrow Point Dam, Colorado. and back into the Gunnison River.*
ON THE COVER: Water falls from the spillway on Crystal Dam. Colorado (Reclamation photos)